Fish & Wildlife Division

SPECIES AT RISK

2008 Survey of Trumpeter Swans (*Cygnus buccinator*) in the Lesser Slave Area, Alberta

Alberta Species at Risk Report No. 133

Government of Alberta

2008 Survey of Trumpeter Swans (*Cygnus buccinator*) in the Lesser Slave Area, Alberta

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and
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EXECUTIVE SUMMARY

Trumpeter Swans found in Alberta form approximately 30% of the Rocky Mountain population and have experienced substantial population growth and range expansion over the last 15 years. The species is currently classified as *Threatened* in Alberta under the provincial Wildlife Act but is considered to be *Not at Risk* in Canada by the Committee on the Status of Endangered Wildlife in Canada.

Prior to 2000, surveys were conducted on a small portion of the Lesser Slave Area, specifically that area in the vicinity of Russell and Sawn Lakes. However, since 2000, all known or suspected areas of suitable Trumpeter Swan breeding habitat within the management area were surveyed. This survey marked the third attempt to complete a comprehensive and systematic search of potential breeding habitat for Trumpeter Swans in the Lesser Slave Area.

The survey was conducted from Slave Lake on 3-4 September 2008 and from High Prairie on 5 September using a Bell 206 Jet Ranger. All waterbodies that had the potential to support Trumpeter Swans were surveyed by flying at low level around the perimeter of the wetland.

A total of 195 Trumpeter Swans were observed of which 125 were adults and sub-adults and 70 were cygnets. Of these, 21 pairs with broods and 31 pairs without young were observed. Brood size ranged from one to six young and averaged 3.33 young per adult pair. Thirteen new lakes were identified as breeding lakes.

Population demographics and observed distribution indicate that Trumpeter Swans are doing well in the Lesser Slave Area. Increasing population size and number of pairs with and without young combined with decreasing mean brood size indicate that Trumpeter Swans appear to have saturated the most productive breeding habitats and that new and younger breeding pairs may be establishing territories on less productive lakes. Thus, the rate of occupation and expansion within their former breeding range appears to be decreasing in favour of in-filling within that range.

Recommendations are made on search areas for future surveys and maintaining land use guidelines around known Trumpeter Swan breeding lakes.

1.0 INTRODUCTION

Continent-wide surveys for Trumpeter Swans are completed every five years. In Alberta, previous surveys were conducted in 1985, 1990, 1995, 2000, and 2005 (Shandruk 1991, Moyles and Johnson 1995, Norton and Beyersbergen 2000, Heckbert 2001, Beyersbergen 2007). In addition to the broad continental surveys, Alberta Fish and Wildlife Division staff have monitored Trumpeter Swans periodically in north-western Alberta since 1989. The survey is designed to inventory breeding and non-breeding Trumpeter Swans throughout their known summer breeding range. Accurate inventories aid in determining the population status of the various breeding groups in Canada and throughout the rest of the continent and supports necessary population and habitat management initiatives. In northern Alberta, periodic updates of breeding wetlands is necessary in order to apply appropriate land use guidelines to ensure the maintenance of habitat integrity for breeding pairs. Lakes designated as breeding habitat receive special status with specific land use guidelines applied to the surrounding uplands.

Trumpeter Swans found in Alberta form approximately 30% of the Rocky Mountain population and have experienced substantial population growth and range expansion over the last 15 years. Most of these birds overwinter in the north western states of Montana, Idaho, and Wyoming. The species is currently classified as *Threatened* in Alberta under the provincial Wildlife Act but is considered to be *Not at Risk* in Canada by the Committee on the Status of Endangered Wildlife in Canada.

Prior to 2000, surveys were conducted on a small portion of the Lesser Slave Area, specifically that area in the vicinity of Russell and Sawn Lakes (Moyles and Johnson 1995). However, since 2000, all known or suspected areas of suitable Trumpeter Swan breeding habitat within the management area were surveyed. This report presents the results of a Trumpeter Swan survey conducted in 2008 in the Lesser Slave Area and some general comparisons with the 2000 and 2005 surveys.

2.0 METHODS

The survey area was determined by compiling locations of Trumpeter Swans sighted by ASRD staff, pilots, industry staff and local residents between 1995 and 2008. Historical nesting locations were also surveyed. Suitable habitat on the "fringe" of known Trumpeter Swan breeding range was systematically searched for pioneering adult birds. The survey area was divided into five broad general search areas based upon density of suitable nesting habitat (i.e. lakes and ponds), previous swan breeding and observations records, and flight distance time from Slave Lake and High Prairie. These were:

- Fawcett, Otter, and Orloff Lakes area;
- Nipisi, Cranberry, Muskwa, and Wabasca Lakes area;
- southern Buffalo Head Hills, Lubicon and Loon Lakes area;
- Peavine and Gift Lake Metis Settlement Areas and broad region of small lakes north of Utikuma Lake, and the;
- Iroquois, Maurice, and Winagami Lakes area.

Aerial Trumpeter Swan surveys are typically conducted in early September prior to swan fall migration as size of the cygnets at that time makes it easier to get an accurate brood count while still identifying the breeding lake. The survey was conducted out of Slave Lake on 3-4 September 2008 and out of High Prairie on 5 September using a Bell 206 Jet Ranger from Delta Helicopters Ltd. The aircraft was refuelled out of the Slave Lake, Wabasca, Red Earth, and High Prairie airports, wherever was most convenient based on location, area left to search, and remaining fuel.

All waterbodies that had the potential to support Trumpeter Swans were surveyed by flying at low level (100-150 m high and 80 knots) around the perimeter of the wetland. All lakes, sizeable beaver ponds, and drainages within the survey areas were surveyed.

When swans were observed, a count of the number of individuals was recorded from normal survey flight altitude. Cygnets are occasionally difficult to count from higher altitudes due to their drab grey coloration, presence of emergent vegetation, and because they tend to huddle together when frightened. Multiple passes with the aircraft were sometimes necessary in order to obtain accurate brood counts.

All crew members acted as observers and the navigator (left front seat) also directed and recorded flight routes and all sightings of adults and young on 1:250,000 topographical base maps used for navigation as well as using a handheld Garmin GPSmap 60Cx GPS unit. The additional observer sat behind the pilot (rear right).

3.0 RESULTS

All suitable waterbodies in a total of 182 townships were surveyed. The townships covered during the survey and location of swan observations are shown in Figure 1. The survey coverage was similar to the 2005 survey but did not cover the region around Peerless and Graham Lakes. A total of 195 Trumpeter Swans were observed of which 125 were adults and sub-adults and 70 were cygnets (Table 1). Of these, 21 pairs with broods and 31 pairs without young were observed. Additionally, three flocks totalling 11 adult swans without young and 10 single adult birds were also recorded. Brood size ranged from one to six young and averaged 3.33 young per adult pair. Survey details are provided in Appendix 1. Thirteen new lakes were identified as breeding lakes for Trumpeter Swans.

Population demographics and distribution from the 2000 and 2005 surveys are presented in Table 1 and Figures 2 and 3. Following a review of the 2000 Trumpeter Swan survey data, inconsistencies were noted between the regional, provincial, and national reports as well as the data in the Fish and Wildlife Management Information System of Alberta Sustainable Resource Development (FWMIS; Norton and Beyersbergen 2000, Heckbert 2001, James and James 2001). Corrections to the data are presented in this report (Table 1 and Appendix 2).

Total population as well as the number of breeding pairs and pairs without cygnets appear to be increasing over survey years in the Lesser Slave Area (Table 1). The total population and the number of breeding pairs more than doubled between 2000 and 2005 and increased by 23% and 24%, respectively, between 2005 and 2008. The number of pairs without cygnets increased fourfold between 2000 and 2005 and nearly doubled between 2005 and 2008. Conversely, mean brood size which is a demographic less vulnerable to exact search area, appears to be declining over time (Table 1). However, these figures are not corrected for differences in survey coverage, available nesting habitat (i.e. early vs. late spring), weather, and predators between survey years.

The region of Peavine and Gift Lake Metis Settlement Areas and the broad region of small lakes north of Utikuma Lake yielded by far the highest densities of paired birds, both breeding and non-breeding or failed breeding pairs. Surveys in this area recorded 15 breeding pairs of which nine were new breeding lakes in 2008 with an additional 19 non-breeding or failed breeding pairs also observed. Two thirds (67%) of all pairs observed during the survey were found in this area.

Three breeding pairs, five pairs without young, and two single birds were observed in the broad region between Highway 88 and 754 north to a line drawn between Cranberry, Muskwa, and Godin Lakes. Six lakes recognised as Trumpeter Swan breeding lakes in this region did not have any breeding pairs present during this survey. Although lake and pond densities are much lower than northwest of Utikuma Lake, the area has the potential to hold many more breeding pairs as the habitat appears suitabile. Lakes in this region are

characterised by highly variable shorelines with numerous bays and abundant palatable submergent vegetation.

Nine Trumpeter Swan breeding lakes have been identified during previous surveys in the southern Buffalo Head Hills in the area surrounding Sawn and Russell Lakes. Surprisingly, during the course of this survey only one breeding pair was observed using a known breeding lake and one non-breeding pair was observed in a beaver flooded pond near a known breeding lake.

The locations of all Trumpeter Swan breeding lakes identified in the Lesser Slave Area are presented in Figure 4.

Table 1. Population demographics for Trumpeter Swan surveys conducted in 2000, 2005, and 2008 in the Lesser Slave Area.

Population Parameters	2000	2005	2008
Total number of Trumpeter Swans	77	159	195
Number of adults and sub-adults	40	97	125
Number of cygnets	37	62	70
Number of broods	8	17	21
Mean brood size	4.63	3.65	3.33
Number of singles	3	7	10
Number of pairs without cygnets	4	16	31
Number of adults and sub-adults in flocks	13	24	11
Number of flocks	3	6	3

Total cost for the Lesser Slave Area 2008 Trumpeter Swan survey was 29,632.05$. This figure includes flight time, pilot meals and accommodations, landing fees, and 2,871.55$ in fuel. A total of 24.8 hours were flown over the three survey days. Alberta Fish and Wildlife staff time associated with the survey was 15 days including field work, data compilation, and report preparation. This figure does not include overtime incurred during field work.

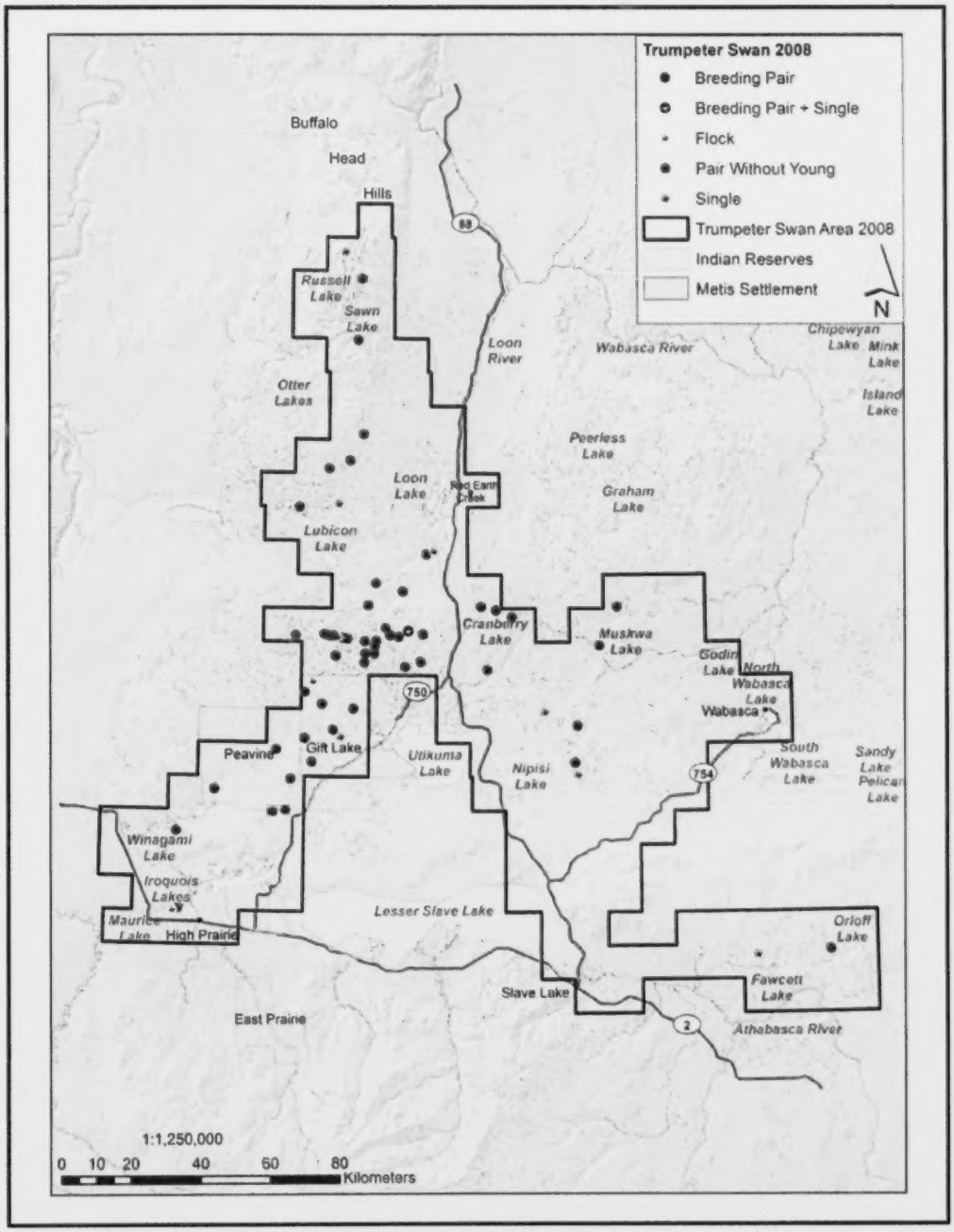

Figure 1. Survey area boundaries and location of Trumpeter Swans observed during the Lesser Slave Area swan survey, 3-5 September 2008.

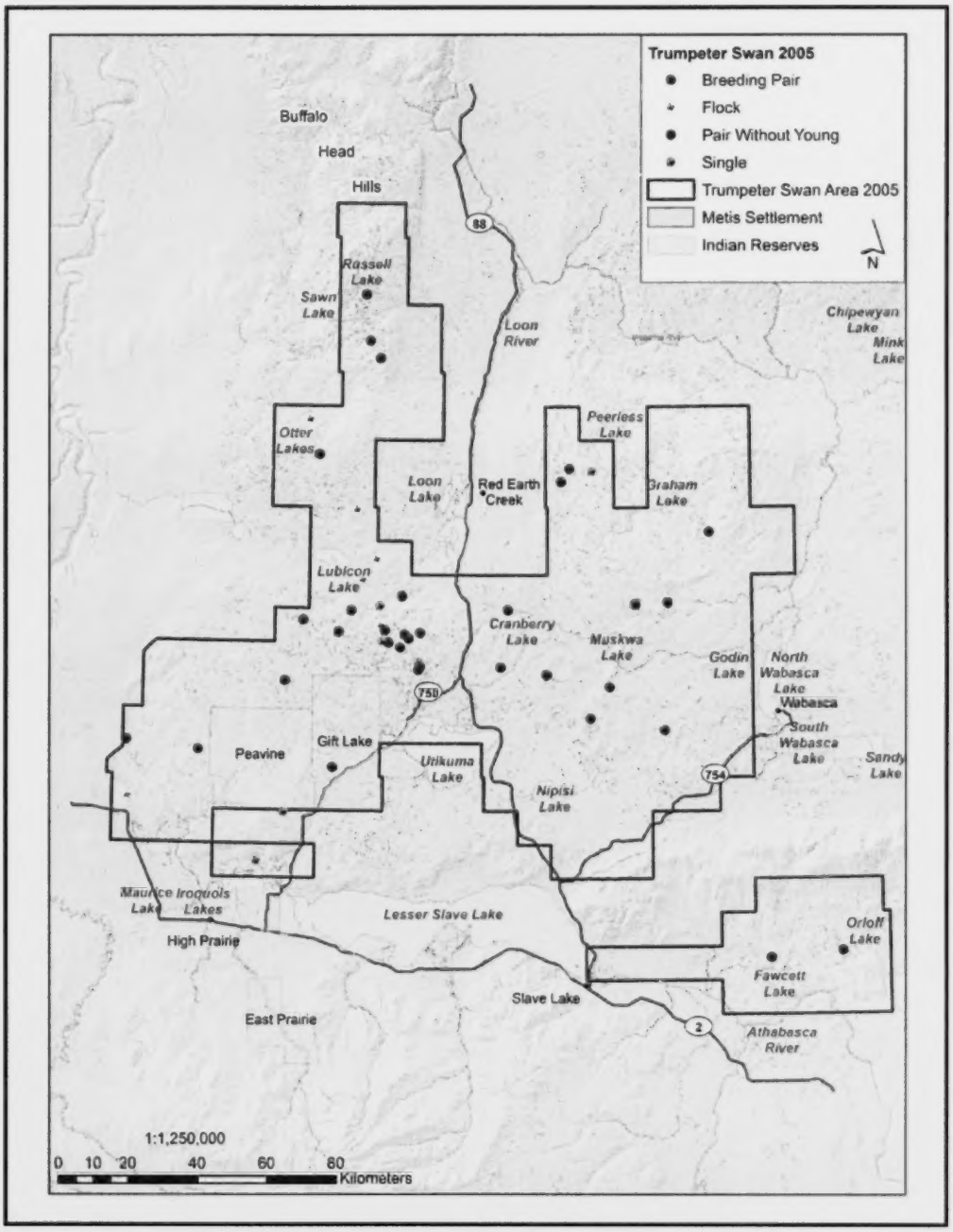

Figure 2. Survey area boundaries and location of Trumpeter Swans observed during the Lesser Slave Area swan survey, 25-26 August 2005.

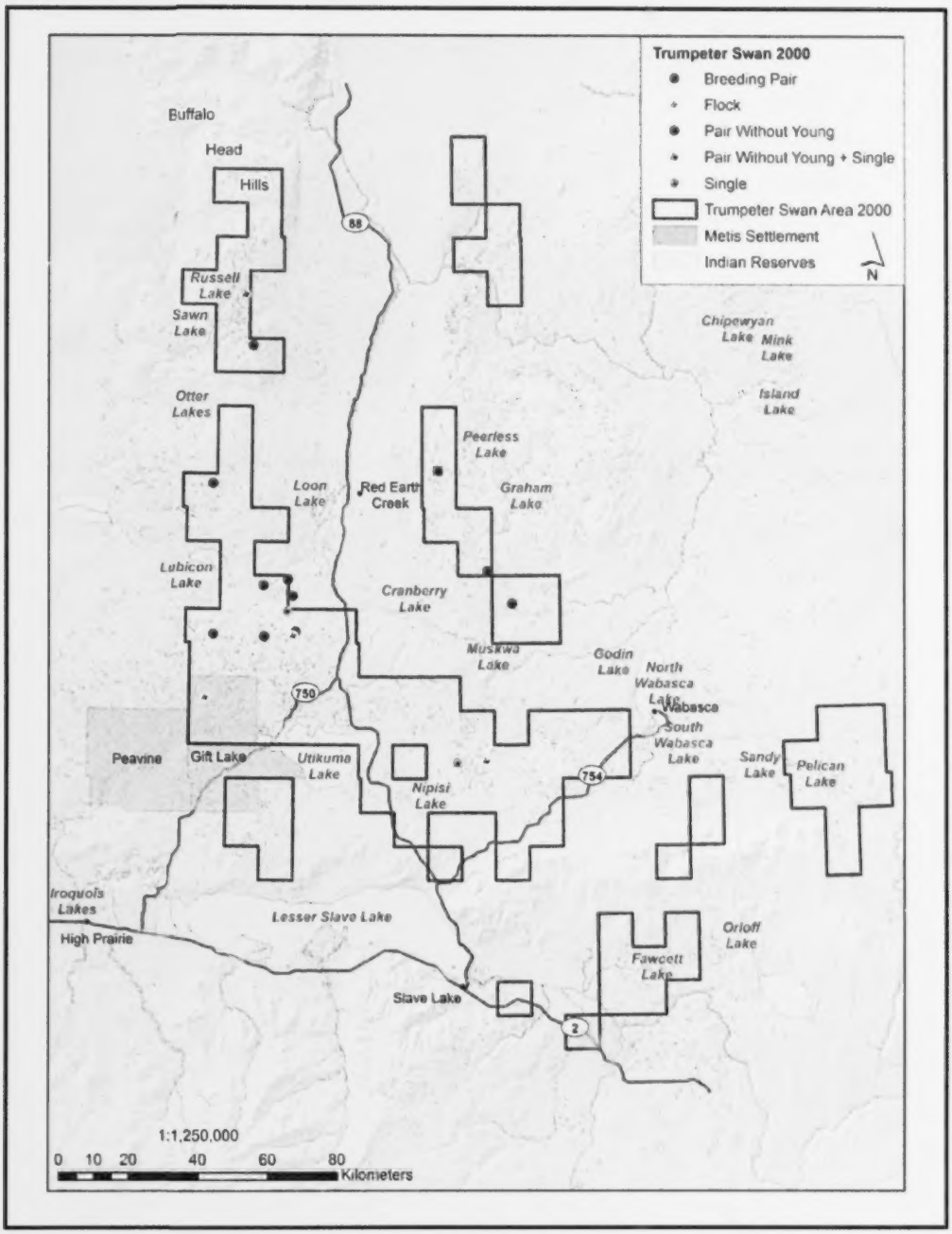

Figure 3. Survey area boundaries and location of Trumpeter Swans observed during the Lesser Slave Area swan survey, 29-30 August 2000.

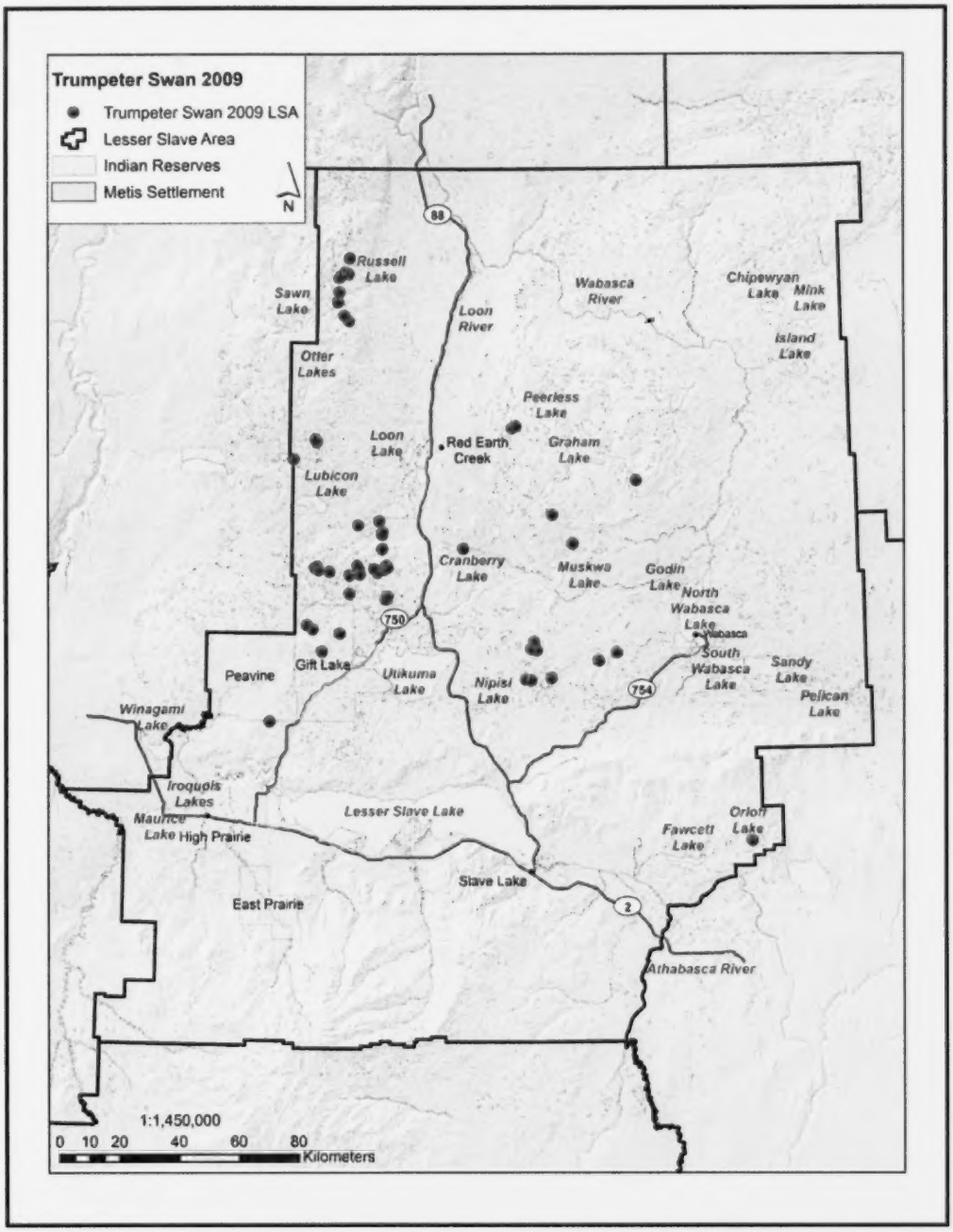

Figure 4. Corporate boundaries of the Lesser Slave Area and location of Trumpeter Swan breeding lakes as per the Lesser Slave Area Land Management Referral Map.

4.0 DISCUSSION

This survey marked the third attempt to complete a comprehensive and systematic search of potential breeding habitat for Trumpeter Swans in the Lesser Slave Area (Norton and Beyersbergen 2000, Heckbert 2001, Beyersbergen 2007). Exact comparison between survey years is problematic given that methodology varied slightly. For one, although the core survey area remained the same, each survey covered a slightly different area dropping or adding parts of the range at the periphery based on reports of sighted birds, water conditions, timing, and remaining fuel. Secondly, whereas the 2000 and 2005 surveys were conducted using a fixed-wing aircraft (e.g. Cessna 185 in 2000) the 2008 survey was performed with a helicopter (Bell 206). It is reasonable to assume that the search efficiency would have been higher and observer fatigue would have been lower using a rotary winged aircraft rather than a fixed wing aircraft. Therefore, any broad inferences of population status based on observed demographics between years should be critically examined.

Population demographics and observed distribution indicate that Trumpeter Swans are doing well in the Lesser Slave Area. Increasing population size and number of pairs with and without young combined with decreasing mean brood size indicate that Trumpeter Swans appear to have saturated the most productive breeding habitats and that new and younger breeding pairs may be establishing territories on less productive lakes. Also, thirteen new breeding lakes were identified during this survey and the number of pairs without cygnets more than doubled between 2005 and 2008. Some of these pairs may be failed breeding pairs and some may also have been young pairs establishing new territories. Thus, the rate of occupation and expansion within their former breeding range appears to be decreasing in favour of in-filling within that range.

Declining brood size may be cause for alarm at first glance, however, mean brood size has actually been high in all years compared to numerous other studies across the continent (Mitchell 1994). Furthermore, Trumpeter Swan have been shown to live into their twenty's in the wild and annual survival rates for birds greater than two years old is in the order of 80 to 100% (Mitchell 1994). High productivity combined with low mortality and long life spans are all factors that contribute to increase population size. All these likely indicate very favourable breeding and foraging habitat for Trumpeter Swans in the Lesser Slave Area.

Another factor contributing to Trumpeter Swan recovery in north western Alberta is the creation of land use guidelines protecting habitat around lakes identified as swan breeding lakes (Appendix 3). These guidelines apply to all activities (e.g. geophysical, agricultural, forestry) and sets distance, timing, and activity restrictions around such lakes. These guidelines protect the integrity of the habitat and reduce disturbance of breeding pairs thereby contributing to improve nesting success and overall productivity over the breeding range.

Although no detailed records were kept on the habitat characteristics of ponds and lakes used versus not used by Trumpeter Swans some incidental observations can be made. Typically, swans seemed to favour lakes with variable shorelines cut by numerous bays and points with an abundance of palatable emergent and submergent vegetation. Well vegetated creeks and draws flooded by beavers also seemed to be favoured by swan pairs; perhaps as movement corridors between ponds and lakes. Lake size did not seem to be a critical factor as long as small lakes were part of lake chains connected by small creeks as many swans were observed on lakes smaller than 10 acres. Wetlands with recreational or industrial developments associated with their shorelines appeared to be avoided throughout much of the survey area. The exception to this would be the industrial development area northwest of Utikuma Lake which had a high density of breeding and non-breeding pairs some of which were on lakes adjacent to linear right of ways and industrial leases. Lakes in this area were well suited as swan habitat based on the aforementioned characteristics.

Muskeg ponds and lakes with moss and ericaceous vegetation seemed to be avoided by swans. No swans were observed on muskeg ponds and lakes during the 2008 survey. Such ponds were easily identified from a distance by their roughly circular shapes and were usually surrounded by an outer ring of moss and ericaceous shrubs (e.g. Labrador tea) and conifer forest (spruce and tamarack).

5.0 RECOMMENDATIONS

The next national survey of Trumpeter Swans is scheduled for the summer 2010. It is recommended that the same areas surveyed in 2008 be surveyed with expanded coverage to different areas where swans have been reported via sighting cards and district occurrence reports in recent years. Areas requiring closer scrutiny include:

- The area surrounding the Salt Prairie Fire Lookout east of Highway 750, southwest of Utikuma Lake and north of Lesser Slave Lake.
- The lake region surrounding Graham and Peerless Lakes to the Wabasca River.
- Surveys conducted over the Peavine and Gift Lake Metis Settlement Areas and the broad region of small lakes north of Utikuma Lake revealed nine new swan breeding lakes in 2008. Additionally, a total of 19 pairs without young were also observed in this area. This broad area deserves particular attention during the next survey as a number of new breeding lakes are likely to be indentified.

Trumpeter Swans appeared to avoid muskeg ponds and lakes. Given the high cost associated with flying extensive surveys over northern Alberta, regions of muskeg habitat could be removed from search areas in favour of finding new swan lakes in high swan density areas to cut costs as these do not appear to be preferred Trumpeter Swan breeding habitat.

To ensure that swan populations continue expanding and in-filling within their former range, we strongly recommend that industrial developers adhere to the land use guidelines and that these be enforced by regulatory agencies.

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7.0 APPENDICES

Appendix 1. Location and number of Trumpeter Swan observations, Lesser Slave Area, 3-5 September 2008.

Waterbody Name	Latitude			Longitude			Land Location	No. Adults	No. Cygnets	Total	Status	New Breeding Pair in 2008?
	Deg	Min	Sec	Deg	Min	Sec						
Fawcett River	55	20	54.9	-113	56	10.6	SE28-73-26-W4	1	0	1	Single	
Otter Lake	55	21	37.2	-113	36	16.2	SE34-73-24-W4	2	4	6	Breeding Pair	Yes
Unnamed lake, pond, or drainage	56	15	2.7	-114	34	11.8	SW4-84-4-W5	2	0	2	Non-Breeding or Failed Pair	
Muskwa Lake	56	8	59.7	-114	39	12.8	SE35-82-5-W5	2	0	2	Non-Breeding or Failed Pair	
Sawle Lake	55	58	41.9	-114	54	23.2	NW32-80-6-W5	1	0	1	Single	
Berry Lake	55	56	36.2	-114	45	21.8	SW20-80-5-W5	2	4	6	Breeding Pair	No
McConachie Lake	55	50	51.8	-114	46	1.6	NE18-79-5-W5	2	3	5	Breeding Pair	Yes
McConachie Lake	55	48	59.7	-114	45	16.3	SW5-79-5-W5	1	0	1	Single	
Unnamed lake, pond, or drainage	56	5	16.4	-115	10	24.2	SW10-82-8-W5	2	0	2	Non-Breeding or Failed Pair	
Cranberry Lake	56	13	26.4	-115	3	34.1	SE29-83-7-W5	2	0	2	Non-Breeding or Failed Pair	
Cranberry Lake	56	14	30.7	-115	7	55.7	NW36-83-8-W5	2	5	7	Breeding Pair	Yes
Unnamed lake, pond, or drainage	56	15	2.2	-115	12	6.9	SW4-84-8-W5	2	0	2	Non-Breeding or Failed Pair	
Unnamed lake, pond, or drainage	57	10	6.1	-115	50	45.5	SW22-94-12-W5	1	0	1	Single	
Unnamed lake, pond, or drainage	57	5	58.2	-115	45	56.5	NW30-93-11-W5	2	0	2	Non-Breeding or Failed Pair	
Unnamed lake, pond, or drainage	56	56	26.5	-115	46	57.3	NE36-91-12-W5	2	3	5	Breeding Pair	No
Unnamed lake, pond, or drainage	56	41	48.9	-115	45	18.9	NW6-89-11-W5	2	0	2	Non-Breeding or Failed Pair	
Loon River Drainage	56	37	40.5	-115	48	58.8	SE15-88-12-W5	2	0	2	Non-Breeding or Failed Pair	
Unnamed lake, pond, or drainage	56	36	25.1	-115	54	50.2	NW6-88-12-W5	2	0	2	Non-Breeding or Failed Pair	
Unnamed lake, pond, or drainage	56	30	59.3	-115	52	4.1	NE5-87-12-W5	1	0	1	Single	
Unnamed lake, pond, or drainage	56	30	23.4	-116	3	8.5	NW31-86-13-W5	2	6	8	Breeding Pair	Yes
Unnamed lake, pond, or drainage	56	23	12.1	-115	27	25.8	NE23-85-10-W5	2	0	2	Non-Breeding or Failed Pair	
Unnamed lake, pond, or drainage	56	23	39.2	-115	25	24.9	SW30-85-9-W5	1	0	1	Single	
Unnamed lake, pond, or drainage	55	43	10.2	-116	9	45.2	NW31-77-14-W5	2	3	5	Breeding Pair	Yes
Unnamed lake, pond, or drainage	55	43	26.9	-116	6	9.9	SE4-78-14-W5	2	0	2	Non-Breeding or Failed Pair	
Unnamed lake, pond, or drainage	55	48	14.6	-116	4	51.8	NE34-78-14-W5	2	0	2	Non-Breeding or Failed Pair	

Appendix 1. Continued.

Waterbody Name	Latitude			Longitude			Land Location	No. Adults	No. Cygnets	Total	Status	New Breeding Pair in 2008?
	Deg	Min	Sec	Deg	Min	Sec						
Unnamed lake, pond, or drainage	55	50	53.9	-115	59	6.1	NE17-79-13-W5	2	0	2	Non-Breeding or Failed Pair	
Unnamed lake, pond, or drainage	55	55	52.4	-115	53	17.1	SE13-80-13-W5	2	4	6	Breeding Pair	Yes
Unnamed lake, pond, or drainage	55	54	46.8	-115	51	10.1	SW8-80-12-W5	1	0	1	Single	
Hawkins Lake	55	59	8.9	-115	47	38.1	SW3-81-12-W5	2	4	6	Breeding Pair	Yes
Unnamed lake, pond, or drainage	56	6	19.8	-115	44	43.7	SW13-82-12-W5	2	4	6	Breeding Pair	Yes
Unnamed lake, pond, or drainage	56	7	44.2	-115	44	29.1	NW24-82-12-W5	2	0	2	Non-Breeding or Failed Pair	
Unnamed lake, pond, or drainage	56	7	44.8	-115	41	58.2	NE19-82-11-W5	2	0	2	Non-Breeding or Failed Pair	
Unnamed lake, pond, or drainage	56	8	53.9	-115	41	53.9	SE31-82-11-W5	2	0	2	Non-Breeding or Failed Pair	
Unnamed lake, pond, or drainage	56	9	37.8	-115	44	38.2	SE1-83-12-W5	2	1	3	Breeding Pair	Yes
Unnamed lake, pond, or drainage	56	9	41.9	-115	41	29.3	SE5-83-11-W5	2	4	6	Breeding Pair	No
Unnamed lake, pond, or drainage	56	11	41.7	-115	38	46.3	SE15-83-11-W5	2	0	2	Non-Breeding or Failed Pair	
Unnamed lake, pond, or drainage	56	10	35.6	-115	37	35.3	SW11-83-11-W5	2	2	4	Breeding Pair	No
Unnamed lake, pond, or drainage	56	5	37.3	-115	33	19.5	SW7-82-10-W5	2	3	5	Breeding Pair	No
Unnamed lake, pond, or drainage	56	6	28.1	-115	29	0.2	SW15-82-10-W5	2	0	2	Non-Breeding or Failed Pair	
Unnamed lake, pond, or drainage	56	17	25.9	-115	34	6.1	SE19-84-10-W5	2	4	6	Breeding Pair	Yes
Unnamed lake, pond, or drainage	56	18	41.6	-115	41	35.8	SE29-84-11-W5	2	0	2	Non-Breeding or Failed Pair	
Unnamed lake, pond, or drainage	56	15	15.7	-115	43	41.7	NW6-84-11-W5	2	0	2	Non-Breeding or Failed Pair	
Unnamed lake, pond, or drainage	56	11	15.7	-115	32	32.2	NE8-83-10-W5	3	3	6	Breeding Pair	No
Unnamed lake, pond, or drainage	56	10	46.7	-115	28	21.5	SW11-83-10-W5	2	0	2	Non-Breeding or Failed Pair	
Unnamed lake, pond, or drainage	56	10	22.3	-115	35	9.9	NE1-83-11-W5	2	5	7	Breeding Pair	No
Unnamed lake, pond, or drainage	56	10	4.9	-115	49	30.3	NE4-83-12-W5	2	0	2	Non-Breeding or Failed Pair	
Unnamed lake, pond, or drainage	56	10	12.3	-115	51	8.2	NE5-83-12-W5	3	1	4	Breeding Pair	Yes
Unnamed lake, pond, or drainage	56	10	17.5	-115	52	6.2	NW5-83-12-W5	1	0	1	Single	
Unnamed lake, pond, or drainage	56	10	30.9	-115	53	24.5	SW7-83-12-W5	2	0	2	Non-Breeding or Failed Pair	
Unnamed lake, pond, or drainage	56	10	30.7	-115	54	36.1	SE12-83-13-W5	2	1	3	Breeding Pair	Yes
Unnamed lake, pond, or drainage	56	10	43.7	-115	55	51.2	SE11-83-13-W5	2	3	5	Breeding Pair	No
Unnamed lake, pond, or drainage	56	10	30.7	-116	3	50.8	SE12-83-14-W5	2	0	2	Non-Breeding or Failed Pair	

Appendix 1. Continued.

Waterbody Name	Latitude			Longitude			Land Location	No. Adults	No. Cygnets	Total	Status	New Breeding Pair in 2008?
	Deg	Min	Sec	Deg	Min	Sec						
Unnamed lake, pond, or drainage	56	7	22.5	-115	52	41.2	SW19-82-12-W5	2	0	2	Non-Breeding or Failed Pair	
Unnamed lake, pond, or drainage	56	3	22.1	-115	58	54.9	NW28-81-13-W5	3	0	3	Flock	
Unnamed lake, pond, or drainage	56	1	40.7	-116	1	10.8	NE18-81-13-W5	2	0	2	Non-Breeding or Failed Pair	
Unnamed lake, pond, or drainage	55	59	51.7	-115	56	20.3	NE3-81-13-W5	2	3	5	Breeding Pair	Yes
Unnamed lake, pond, or drainage	55	54	32.1	-116	1	7.8	NE6-80-13-W5	2	0	2	Non-Breeding or Failed Pair	
Unnamed lake, pond, or drainage	55	52	48.4	-116	8	53.8	NE29-79-14-W5	2	0	2	Non-Breeding or Failed Pair	
Unnamed lake, pond, or drainage	55	46	34.6	-116	25	42.9	NW21-78-16-W5	2	0	2	Non-Breeding or Failed Pair	
Iroquois Lakes	55	28	23.6	-116	34	17.9	NE4-75-17-W5	5	0	5	Flock	
Iroquois Lakes	55	27	56.1	-116	35	20.5	SE5-75-17-W5	2	0	2	Non-Breeding or Failed Pair	
Iroquois Lakes	55	27	40.9	-116	36	38.0	NW31-74-17-W5	3	0	3	Flock	
Heart River	55	40	2.1	-116	36	0.1	SE17-77-17-W5	2	0	2	Non-Breeding or Failed Pair	
							Total	**125**	**70**	**195**		

Appendix 2. Location and number of Trumpeter Swan observations, Lesser Slave Area, 29-30 August 2000.

Waterbody Name	Latitude			Longitude			Land Location	No. Adults	No. Cygnets	Total	Status
	Deg	Min	Sec	Deg	Min	Sec					
Unnamed Lake	55	51	22.0	-114	39	50.0	SE23-79-5-W5	4		4	Flock
Unnamed Lake	55	51	5.0	-114	47	54.0	NW13-79-6-W5	1		1	Single
Unnamed Lake	56	1	4.0	-115	57	53.0	SE16-81-13-W5	5		5	Flock
Unnamed Lake	56	11	19.0	-115	32	52.0	SW17-83-10-W5	2	7	9	Breeding Pair
Unnamed Lake	56	10	43.8	-115	33	34.3	SE7-83-10-W5	4		4	Flock
Unnamed Lake	56	10	33.0	-115	41	29.0	NE8-83-11-W5	2	5	7	Breeding Pair
Unnamed Lake	56	14	32.0	-115	35	16.0	NE36-83-11-W5	1		1	Single
Beaver Pond	56	16	52.0	-115	33	44.0	SE18-84-10-W5	2	4	6	Breeding Pair
Unnamed Lake	56	19	26.0	-115	35	5.0	SE36-84-11-W5	2	2	4	Breeding Pair
Unnamed Lake	56	10	55.0	-115	55	46.0	NE11-83-13-W5	2	5	7	Breeding Pair
Beaver Pond	56	18	30.0	-115	41	49.0	SE29-84-11-W5	2	4	6	Breeding Pair
Unnamed Lake	56	34	13.0	-115	56	11.0	SW25-87-13-W5	2	4	6	Breeding Pair
Unnamed Lake	56	15	41.0	-114	32	34.0	SW10-84-4-W5	2	6	8	Breeding Pair
Beaver Pond	56	20	45.0	-114	39	18.0	NW1-85-5-W5	2		2	Pair Without Young
Unnamed Lake	56	36	19.0	-114	53	6.0	NE4-88-6-W5	2		2	Pair Without Young
Unnamed Lake	56	55	40.0	-115	45	22.0	NE30-91-11-W5	2		2	Pair Without Young
Unnamed Lake	57	3	31.6	-115	47	32.4	NW12-93-12-W5	3		3	Pair Without Young + Single
							Total	**40**	**37**	**77**	

Appendix 3. Land use guidelines for Trumpeter Swan habitat in Alberta.

Rationale for Special Protection of Trumpeter Swan Habitat

Trumpeter Swans breed on lakes, beaver ponds, and marshes scattered mainly across the Aspen Parkland and Boreal natural regions of Alberta. The majority of swans are found in northern Alberta near Grande Prairie, Peace River, High Level, High Prairie, Edson, and Lac La Biche. Small populations are also found in southern Alberta near Pincher Creek and central Alberta near Elk Island National Park. The species formerly bred throughout Alberta, but was thought to have been extirpated by the early 1900s, at which time it was thought to be close to extinction across its range.

Today, Trumpeter Swans are listed as a *Threatened* species under Alberta's *Wildlife Act*, and as such are afforded protection against hunting and the destruction of nests. The population of Trumpeter Swans in Alberta is increasing, but very small (fewer than 1000 breeding individuals). There are still concerns about whether the recovery will continue, as well as concerns about the security of the wintering habitat of the Alberta birds. Populations do not appear to establish themselves easily in new wintering habitat. Therefore, as long as wintering habitat is limited, the risk of regional extinction for

Trumpeter Swans in Alberta will not be reduced by immigration from neighbouring populations. Accidental hunting and power line collisions are also threats. Trumpeter Swans are sensitive to human disturbance, and human activity in breeding areas may decrease survival of eggs or cygnets. Trumpeter Swans that are disturbed repeatedly may not nest or may abandon an existing nest. Therefore, the breeding population continues to be dependent on current management practices and habitat protection. For further information on species at risk and Trumpeter Swans, please see Alberta Sustainable Resource Development's *Species at Risk* web site and the *Wildlife Status Reports* at the following links:
http://srd.alberta.ca/BioDiversityStewardship/SpeciesAtRisk/Default.aspx
http://srd.alberta.ca/BioDiversityStewardship/SpeciesAtRisk/DetailedStatus/Birds.aspx

In an effort to continue the recovery of Trumpeter Swans, industrial land use guidelines must reflect the sensitive nature of this species. These guidelines serve three primary purposes:

a) Protection of the long term integrity and productivity of Trumpeter Swan breeding habitat;

b) Avoidance of industrial disturbance to Trumpeter Swans during nesting and rearing of cygnets; and

c) Minimise the access created near swan lakes to reduce the potential for secondary disturbance of Trumpeter Swans from recreational use.

Appendix 3. Continued

Land Use Guidelines

The Fish and Wildlife Division of Alberta Sustainable Resource Development recommends the following conditions be applied to activities near Trumpeter Swan habitat through the land use permit system:

All Activities:

- April 1 to Sept. 30, no activity within 800 m of the high water mark of identified lakes or water bodies.
- April 1 to Sept. 30, no direct flights over identified lakes or water bodies.
- No long term development (roads, wells, pipelines, etc.) within 500 m of the high water mark on identified lakes or water bodies.

Geophysical:

- Conventional clearing of new lines must terminate 800 m from the high water mark of identified lakes or water bodies.
- Low impact seismic (LIS) lines must terminate 500 m from the high water mark of identified lakes or water bodies.
- Heliportable and/or hand-cut lines (up to 2.5 m wide) must terminate 100 m from the high water mark of identified lakes or water bodies.
- A survey line of sight (0.5 m) is permitted from 100 m up to the edge of the water body.
- Reuse of existing lines is permitted, however, no re-clearing or disturbance of vegetation is permitted beyond the line widths listed above.
- No shot holes where water or ice exists or on dry lakes (air/mud guns only).

Livestock Grazing:

- No new grazing leases issued adjacent to identified lakes or water bodies
- No range improvement within 500 m of the high water mark on identified lakes or water bodies

Timber Harvesting:

- No timber harvesting within 200 m of high water mark for identified lakes or water bodies. Establishment of a special management zone for timber harvesting between 200 m and 500 m from high water mark, with a detailed plan, is required.

For a list of additional reports in the Alberta Fish and Wildlife Division – Species at Risk Series please go to our website:

http://srd.alberta.ca/BioDiversityStewardship/SpeciesAtRisk/ProgramReports.aspx